

# **EMERGENCY ACTION PLAN FOR MADSEN CREEK FLOW AND WATER QUALITY CONTROL POND**

**State ID KI08-1862  
King County Regional Storm Facility DR0642**



Prepared by:  
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WATER AND LAND RESOURCES DIVISION  
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Under the direction of:  
STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY  
WATER RESOURCES PROGRAM  
DAM SAFETY OFFICE

## **APPROVAL OF EMERGENCY ACTION PLAN FOR MADSEN CREEK FLOW AND WATER QUALITY CONTROL POND**

The undersigned persons have reviewed Emergency Action Plan for Madsen Creek Flow and Water Quality Control Pond and concur with the proposed notification procedures.

\_\_\_\_\_ Date: \_\_\_\_\_

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King County Water and Land Resources Division  
Stormwater Services Section

\_\_\_\_\_ Date: \_\_\_\_\_

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Special Operations Unit

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## **FIGURES**

<b>Figure 1 Inundation Map in the Vicinity of SR 169 .....</b>	<b>10</b>
<b>(from Figure 4.1.1; Madsen Creek: West Basin Water Quality Improvement Engineering Design Report; Feb. 2005)</b>	
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As required by the Washington State Department of Ecology Dam Safety Office (DSO), a dam safety analysis was performed to evaluate hypothetical dam failures for a variety of conditions. The study included a dam break inundation analysis and flood routing. That study is presented in the Madsen Creek: West Basin Water Quality Improvement Engineering Design Report (February 2005; King County Department of Natural Resources and Parks, Water and Land Resources Division, Capital Projects and Open Space Acquisitions Section). This Emergency Action Plan is based on the inundation area defined in that study.

## **I INTRODUCTION**

This Emergency Action Plan (EAP) defines responsibilities and provides procedures designed to identify unusual and low probability conditions, which may endanger the Madsen Flow and Water Quality Control Pond, in time to take remedial action and to notify the appropriate public officials and private property owners downstream of possible, impending, or actual failure of the dam. The EAP contains notification procedures to help safeguard the lives of citizens living along Madsen Creek downstream of the Northwest Tributary and others passing through the area in the event of a failure of the Madsen Creek Flow and Water Quality Control Pond.

Official Dam Name/State ID:

Madsen Creek West Basin Dam/KI08-1862

King County Regional Storm Facility Number:

DR0624

Dam Location:

NE ¼ of Section 27, Township 23, Range 5. Thomas Bros. 656J6.

Located upstream of a Northwest Tributary of Madsen Creek. The main stem of Madsen Creek is located approximately ¼ mile downstream of the pond outlet. The pond is located east of 140<sup>th</sup> Way Southeast and north of Southeast 162<sup>nd</sup> Place on a property owned by King County, but within a 650-foot-wide Bonneville Power Administration (BPA) right-of-way. Access road is located on the east side of 140<sup>th</sup> Way SE (at approximately the virtual intersection with 143<sup>rd</sup> Ave. SE). King County standard facility maintenance key (16-1) is required to unlock bollards for vehicular access. No key is needed for access by foot.

Downstream Flood Path:

North to constructed lined channel to Northwest Tributary; east to Madsen Creek (main stem); north to sedimentation pond; north under State Highway 169 to Cedar River.

Downstream Hazard Classification: 1A

One public road, State Highway 169 (Renton-Maple Valley Highway) is located in the downstream flowpath.

**Public Roads in Downstream Flowpath:**

<b>King County Roads –</b>	<b>206-296-8100</b>		
<b>Road Name</b>	<b>Location</b>	<b>Description: Potential Inundation Areas</b>	<b>Approx. Travel time*</b>
State Highway 169 (Renton-Maple Valley Highway)	Area in-line with the Madsen Creek channel; downstream of sedimentation pond and bypass channel south of Highway.	South side of State Highway 169 between 152 <sup>nd</sup> Ave. SE and 140 <sup>th</sup> Way SE	7.5 to 11 minutes

\*estimated travel time of flood wave in accordance with dam break analysis in the Madsen Creek: West Basin Water Quality Improvement Engineering Design Report (February 2005).

## **II RESPONSIBILITIES**

### **Day to day operation and maintenance of dam:**

- King County Water and Land Resources, Stormwater Services Section (SWSS).

### **Implementation of Emergency Action Plan:**

- King County Water and Land Resources SWSS Manager, Drainage Investigation/Facilities Maintenance (DIFM) Supervisor, or Lead Urban Drainage Emergency Response Senior Staff.

### **Determining and identifying conditions or events that require emergency action:**

- King County Water and Land Resources, SWSS Staff under direction of the Section Manager, DIFM Supervisor, or Lead Urban Drainage Emergency Response Senior Staff, or King County Roads Division (Roads), Special Operations Unit Staff under direction of the SWSS Manager, DIFM Supervisor or Lead Urban Drainage Emergency Response Senior Staff.

### **King County, as dam owner, is also responsible for:**

- Annual Inspections.
- Maintaining the EAP and notification list.
- Coordinating with the Department of Ecology, Dam Safety Office (DSO).

## **INDIVIDUAL RESPONSIBILITIES**

The following list indicates who is responsible for taking specific actions at the dam when there is an emergency situation. In this manner tasks can be well divided so, in an emergency, no one person is overloaded.

### **King County Roads Division Switchboard**

Staffed 24-hours

206-296-8100

- Contact SWSS DIFM Supervisor, SWSS Regional Storm Facility Maintenance Senior Engineer, or Lead Urban Emergency Response Senior Engineer.
- Contact Special Operations Unit supervisor or assigned lead.

## **King County Stormwater Services Section**

Staffed after hours only during large storm events (drainage complaint line) 206-296-1900

- Contact SWSS Stormwater Emergency Response Staff.
- Support Lead in completion of Notification Calls.
- Contact Roads Special Operations Unit supervisor or assigned lead.

## **King County Stormwater Services Section**

SWSS DIFM Supervisor or Stormwater Emergency Response Lead Engineer.

- Implement Emergency Action Plan.

## **King County Roads Special Operations Unit**

Tod Reeve or Lead Staff 206-296-8188, or  
206-296-8100

- Coordinate Emergency Response and Road Closures.

## **III INUNDATION MAPS**

Figure 4.1.1 from the Madsen Creek: West Basin Water Quality Improvement Engineering Design Report (Feb. 2005) shows the approximate area that would be inundated by a worst case dam break. This inundation map is recreated as Figure 1. Parcels potentially impacted are shown on Figure 2.

More than 80 homes and potentially more than 100 mobile homes south of State Route 169 (SE Renton-Maple Valley Highway) could be affected by a flood caused by a sudden breach of Madsen Creek Flow and Water Quality Control Pond. A church, outlying single-family residences and outbuildings, and other vacant properties may also be impacted to a lesser degree, though still at risk. The first properties may be impacted by water approximately 3 to 8 minutes after the dam break. Flood waters would tend to accumulate against the south side of State Route 169 and extend to the west. Pondered water would drain through the system beneath State Route 169 to the Cedar River, unless there is an obstruction.

The manufactured home park and surrounding fields south of State Route 169 are most likely to be affected. An area of 38 acres could be inundated by an average of approximately 8 inches of water according to the dam break analysis. S.R. 169 is two feet higher than the fields to the south, so overtopping is extremely unlikely. S.R. 169 is likely the only public road that could be



impacted by a dam break. Properties north of S.R. 169 are more likely to encounter flooding from the Cedar River than from an upstream dam break. The depth of average inundation is relatively low, and it is expected that some debris would accumulate in some low areas from upstream creek erosion in the event of a dam breach.

The manufactured home park is owned by the King County Housing Authority and is occupied by low-income senior citizens. Based on historical aerial maps, the number of residents significantly varies on this property, which is comprised of one parcel. A resident list would quickly be outdated. An up-to-date residents list would be kept by the housing authority. SWSS should contact the housing authority in the event that dam failure is imminent (see contact list in Appendix B). If failure is in progress, and if appropriate using the notification flow chart below, emergency personnel would be called to evacuate this property. The inundation (possible average depth of 8 inches) would not be expected to be life threatening, but these residents represent a high-risk segment of the population.

The other major populated area is the Pioneer Place subdivision. The call list in Appendix B contains known phone numbers for some residents. *It should be noted that significant numbers of phone numbers are unlisted or these residents may not have landlines available (i.e., cell phone only).* Typical of most emergencies during and after natural disasters, these residents would be reliant primarily on emergency response personnel for notification. The time from failure to inundation makes notification an unrealistic expectation. A letter notifying residents of the most likely scenarios for dam failure will be sent to owners of record.

The church, open space, and other single family residences in this area represent a lower risk for inundation, but are included on the call list in Appendix B.







## IV POSSIBLE EMERGENCY CONDITIONS

Listed below are some, not necessarily all, of the events, which can lead directly to the failure of the dam. Included after each one is a brief outline of steps to take in trying to stabilize the situation. SWSS will be performing the actions listed unless otherwise noted.

### **Earthquake:**

King County has added this facility to the SWSS earthquake response protocols, which established procedures for inspection of critical facilities after significant earthquakes. The determination of when an inspection should occur is documented in the SWSS earthquake response protocols.

In general, the inspection procedures include the following:

- 1) Immediately conduct a general overall visual inspection of the dam.
- 2) If the dam is failing and water is pooled behind the dam, immediately implement the instructions in the section **FAILURE IN PROGRESS**.
- 3) If the dam is damaged to the extent that there is increased flow passing downstream, immediately implement **FAILURE IMMINENT** procedures.
- 4) Otherwise, if damage has occurred, but is not judged serious enough to cause failure of the dam, quickly observe the nature, location, and extent of the damage, as well as the potential for failure. Then contact the DSO at 360-407-6625 or 360-407-6208, or after hours, contact the Washington State Military Department Emergency Management Division at 800-258-5990 (24-hr emergencies) for further instructions. A description of slides, sloughs, new or increased seepage, and sudden subsidence, including the location, extent, rate of subsidence, effects on adjoining structures, springs or seeps, reservoir elevation, prevailing weather conditions, and other pertinent facts would also be helpful.

- 5) If there is no imminent danger of dam failure, SWSS staff should thoroughly inspect the following:
  - a) both faces of the dam for cracks, settlement, or seepage.
  - b) abutments for possible displacement.
  - c) drains or seeps for any turbidity, cloudy or muddy water, or increased flow.
  - d) spillway structure to confirm continued safe operation.
  - e) outlet works for structural integrity.
  - f) reservoir and downstream areas for landslides.
  - g) other appurtenant structures.

Report all findings to the DSO and all other agencies that had been contacted earlier during the emergency. Follow-up inspections of the dam should be conducted over the next two to four weeks as some damage may not show up immediately after the quake.

### **Flooding:**

Review of Drainage Plans indicates that the pond will store the runoff from a 100-year 24-hour storm event with approximately two feet of freeboard. The 100-year 24-hour elevation is 440.7 feet and the dam overflow elevation is 443.0 feet. Inundation models were run assuming that the control outlet structure, the pond emergency spillway, and the drain valve were not functioning, thus allowing water to rise to 443.0 feet. In case of a major flood event, special procedures must be taken to secure life and property downstream. If something should happen to cause the reservoir level to rise within 2 feet of the dam crest (elevation 443.0 ft), contact the DSO and King County Regional Communications and Emergency Coordination Center (RCECC) immediately to report the following:

- 1) current reservoir elevation and freeboard.
- 2) rate the reservoir is rising.
- 3) weather conditions - past, present, predicted.
- 4) discharge conditions of creeks and rivers downstream.

\*\*\*\* ANY TIME THE WATER IN THE RESERVOIR EXCEEDS THE \*\*\*\*  
\*\*\*\* MAXIMUM SAFE LEVEL OF OPERATION, OR ELEVATION 440.7, \*\*\*\*  
\*\*\*\* AT LEAST DAILY INSPECTIONS OF THE DAM ARE REQUIRED \*\*\*\*

If the reservoir level reaches within 2.3 feet of the dam crest, or elevation 440.7 ft. (the 100-year 24-hour storage elevation), immediately implement the following procedures:

- 1) Contact RCECC and DSO.
- 2) Gradually increase discharge with pumps.
- 3) Notify downstream residents of the increases in discharge, and increase the discharge in stages to avoid trapping downstream residents.
- 4) Check downstream toe and abutments for any new seepage or abnormal leakage. If there is any indication of muddy or silty flow, and/or the flow is increasing, implement **FAILURE IMMINENT** process.
- 5) Check for increased/decreased seepage due to a change in water level.
- 6) Check for cracks, slumping, sloughing, sliding, or other distress signals near the dam abutment or crest.

### **Erosion, Slumping/Sloughing, or Cracking of the Dam or Abutment**

Determine the location, size of the affected area(s) (height, width, and depth) severity, estimated seepage discharge, clear or cloudy seepage, and the reservoir and tailwater elevations. If failure appears likely, immediately implement **FAILURE IMMINENT** procedures; otherwise, contact the DSO for instructions.

### **New Springs, Seeps, Sandboils, Increased Leakage, or Sinkholes**

If there is a rapid increase in seeps or if new springs or seeps appear, then one should determine the location, size of the affected area, estimated discharge, nature of the discharge (clear or cloudy), and reservoir and tailwater elevations (a map of the area may be helpful to illustrate where the problem is located). If failure appears likely, implement **FAILURE IMMINENT** procedures; otherwise, report all findings to DSO.

Thorough inspection of the dam in 2010 showed no signs of any seeps, boils, or toe drain flow. Any observation of these types of conditions should be reported to 206-296-1900 or 206-296-8100 for inspection and monitoring.



## **Landslides**

Landslides or potential landslides into the downstream channel, which may impound water or impede downstream flow are of potential concern. All such landslides should be reported to DSO. However, before contacting DSO, determine the size, possible cause, degree of effect on the operation, probability of additional movement of the disturbed area and other slide areas, development of new slide areas, and anything else that seems important.

## **Sudden Water Releases**

In case of sudden planned or unplanned large water releases from the outlet works or spillway (e.g. opening the control structure gates) notify downstream residents and the appropriate agencies of the increased flow.

## **Other Problems**

In case of other problems occurring that might pose a threat to the dam safety, contact DSO and report the situation.

## **End of Emergency Situation and Follow-Up Actions**

Once conditions indicate that there are no longer emergency conditions at the dam site and the proper authorities (e.g. DSO, SWSS, or a professional engineer) have declared the dam safe, SWSS staff should notify the local authorities the emergency is over.

## **V EMERGENCY RESPONSE ACTIONS**

### **FAILURE IN PROGRESS**

If a **failure is in progress**, downstream evacuation of the floodplain must be started immediately in accordance with the following:

- Implement the notification flow chart.
- Advise the King County Sheriff and City of Renton Emergency Operations Center (EOC) to initiate evacuations through RCECC.
- Request road closures as detailed in Appendix E.
- Monitor the failure and downstream conditions.

### **FAILURE IMMINENT**

If **failure of the dam is imminent**, but has not yet begun, the following steps should be initiated immediately:

- Implement the notification flow chart.
- Advise the King County Sheriff and City of Renton EOC to initiate evacuations through RCECC.
- Request road closures as detailed in Appendix E.
- Contact DSO and begin any recommended procedures.
- Take preventive actions as appropriate as described in **VI PREVENTATIVE ACTIONS TO BE TAKEN**.
- Make all possible efforts to reduce downstream flooding.

### **SLOWLY DEVELOPING FAILURE OR UNUSUAL SITUATION**

If there is a **slowly developing failure** or **unusual situation**, where failure is not imminent, but could occur if no action is taken, dam tending personnel should:

- Notify King County Roads Special Operations Unit supervisor or assigned lead.
- Notify DSO.
- Notify RCECC (non-emergency number).
- Monitor the condition closely and take remedial actions as determined by SWSS staff or DSO.

If necessary, implement preventative actions described in Section VI of this plan.



## **VI PREVENTATIVE ACTIONS TO BE TAKEN**

### **IN THE EVENT OF:**

#### **Overtopping by Flood Waters:**

- Open outlet to its maximum capacity (but monitor downstream impacts and respond accordingly).
- Place sandbags along the crest to increase freeboard and force more water through the spillway and outlet.
- Provide erosion-resistant protection to the downstream slope by placing plastic sheets or other materials over eroding areas.
- Divert flood waters around the reservoir basin.
- Create additional spillway capacity by making a controlled breach in a low embankment or dike section where the foundation materials are erosion resistant. **CAUTION: Use only as a last resort. Contact DSO before attempting any controlled breach.**

#### **Reduction in Freeboard and/or Loss of Dam Crest Width:**

- Place additional rip rap or sandbags in damaged areas to prevent further embankment erosion.
- Lower the water level to an elevation below the damaged area by opening control structure shear gate and/or pumping down.
- Restore freeboard with sandbags or earth and rockfill.
- Continue close inspection of the damaged area until the storm is over.

#### **A Slide on the Upstream or Downstream Slope of the Embankment:**

- Lower the water level at a rate, and to an elevation, that is considered safe given the slide condition. If the outlet is damaged or blocked, pumping, siphoning, or a controlled breach may be required.
- Restore lost freeboard if required by placing sandbags or filling in the top of the slide.
- Stabilize slides on the downstream slope by weighting the toe area with additional soil, rock, or gravel.

#### **Erosional Seepage or Leakage (Piping) through the Embankment, Foundation, or Abutments:**

- Plug the flow with whatever material is available (hay bales, bentonite, or plastic sheeting if the entrance to the leak is in the reservoir).
- Lower the water level until the flow decreases to a non-erosive velocity or until it stops.

- Place a blanket filter (a protective sand and gravel filter) over the exit area to hold materials in place.
- Continue lowering the water level until a safe elevation is reached.
- Continue operating at a reduced level until repairs are made.

#### **A Failure of an Appurtenant Structure such as an Outlet or Spillway:**

- Implement temporary measures to protect the damaged structure, such as closing an outlet or providing temporary protection for a damaged spillway.
- Employ experienced, professional divers, if necessary, to assess the problem and possibly implement repair.
- Lower the water level to a safe elevation. If the outlet is inoperable, pumping, siphoning, or a controlled breach may be required.

#### **A Mass Movement of the Dam on its Foundation (Spreading or Mass Sliding Failure):**

- Immediately lower the water level until excessive movement stops.
- Continue lowering the water level until a safe level is reached.
- Continue operation at a reduced level until repairs are made.

#### **Excessive Seepage and High Level Saturation of the Embankment:**

- Lower the water to a safe level.
- Continue frequent monitoring for signs of slides, cracking, or concentrated seepage.
- Continue operations at a reduced level until repairs are made.

#### **Spillway Backcutting Threatening Reservoir Evacuation:**

- Reduce the flow over the spillway by fully opening the control structure outlet.
- Provide temporary protection at the point of erosion by placing sandbags, rip rap materials, or plastic sheets weighted with sandbags.
- When inflow subsides, lower the reservoir to a safe level.
- Continue operating at a lower water level in order to minimize spillway flow.

#### **Excessive Settlement of the Embankment:**

- Lower the water level by releasing it through the outlet or by pumping, siphoning, or a controlled breach.
- If necessary, restore freeboard, preferably by placing sandbags.
- Lower water to a safe level.
- Continue operating at a reduced level until repairs can be made.

## **VII EMERGENCY SUPPLIES AND RESOURCES**

King County emergency response field activities are handled by the Roads Division. All materials, supplies, and laborers are provided or coordinated by the Roads Division at the direction of the SWSS emergency response staff. The RCECC and City of Renton EOC can assist in coordination and should be notified in the event of emergency response activities at this facility.

## APPENDIX A

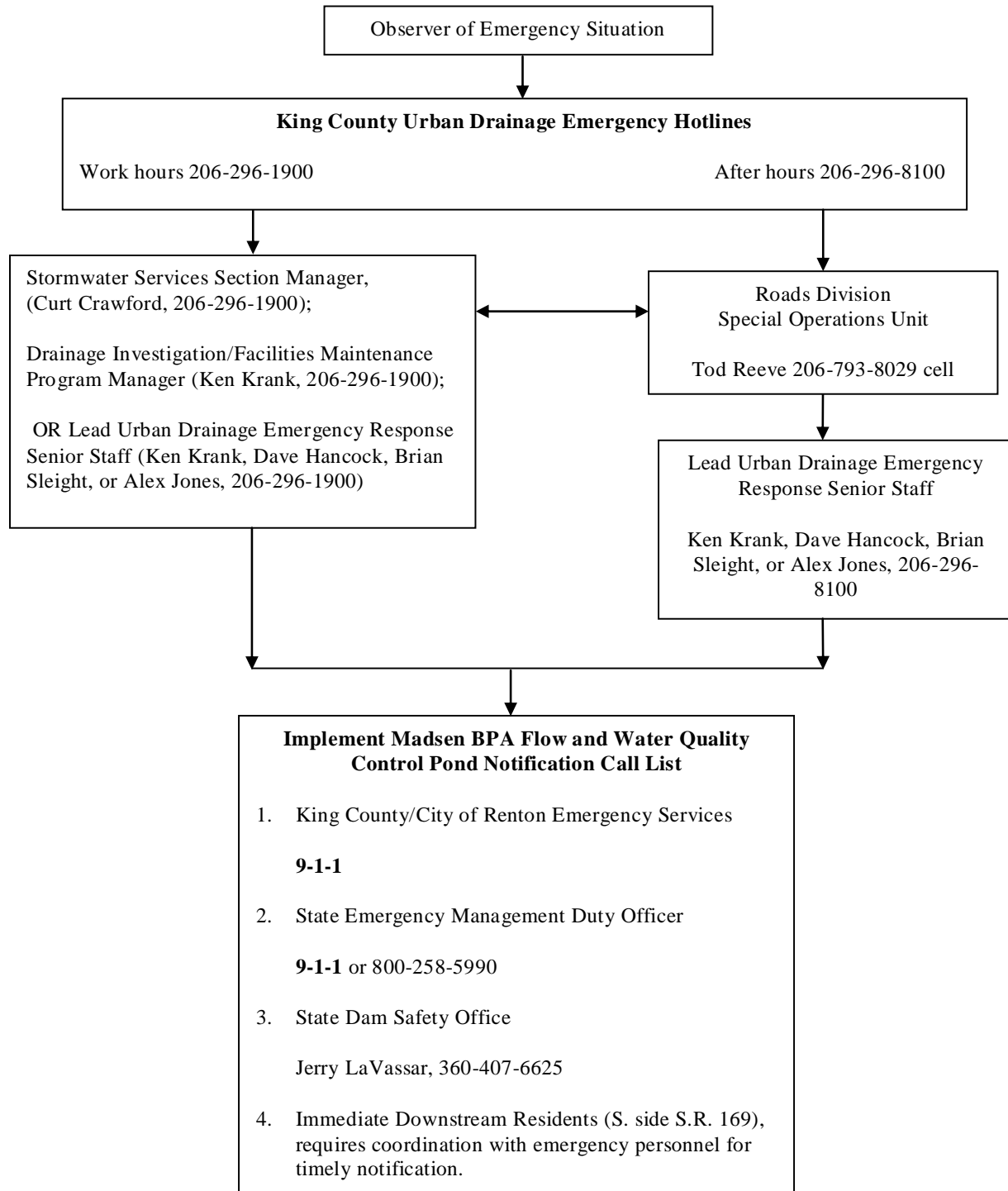
### NOTIFICATION PROCEDURES AND FLOWCHART

#### Notification Procedures

If the need implement the notification of a **FAILURE IN PROGRESS** or a **FAILURE IMMINENT** occurs, the caller will phone in the order of the Notification Call List and alert the person answering of the dam condition and advise evacuation as needed. Calls to the appropriate agency to close roads should be made as soon as possible after evacuation notifications have been made. Multiple callers should be used whenever possible to notify the residential and commercial properties as quickly as possible. The caller notes in the last column of the “List” the time and date of the call and their own name. Only one call needs to be made per location.

If no contact is made with any residential or business property, a request for assistance to notify them should be made to local sheriff, police, or fire departments by sending an officer to the address. It is expected that emergency response personnel from King County and City of Renton shall be the mode of contact for most of the downstream occupants after calling 9-1-1.

## Notification Flowchart



## **APPENDIX C**

### **UPDATING THE EMERGENCY ACTION PLAN**

Updating information in the Emergency Action Plan should be done annually and/or when major changes have occurred. Information to update should include:

- Phone Numbers;
- Housing Developments;
- Personnel Changes;
- EAP Locations;
- Changes made to the Dam;

as well as other items that might come to ones attention throughout the year.

#### **DATES UPDATED**

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

## **APPENDIX D**

### **DISTRIBUTING THE EMERGENCY ACTION PLAN**

A complete copy of this EAP will be provided to the following locations.

#### **EAP LOCATIONS**

1. Madsen Flow and Water Quality Control Pond Regional Storm Facility File DR0624  
Ken Krank, Supervising Engineer  
King County Department of Natural Resources  
Water and Land Resources Division  
Stormwater Services Section  
206-296-8172
2. King County Department of Natural Resources  
Water and Land Resources Division  
Stormwater Services Unit  
Dam Emergency Response Workbooks  
206-296-1900
3. King County Department of Transportation  
Road Services Division  
Maintenance Operations Section  
Steve Wilson, Superintendent  
206-296-8100
4. King County Department of Transportation  
Road Services Division  
Maintenance Operations Section  
Tod Reeve, Supervisor  
206-296-8188
5. Department of Dam Safety Section  
P.O. Box 47600  
Olympia, WA 98504  
360-407-6208 (office)  
1-800-258-5990 (after hours)

## APPENDIX E

### ROAD CLOSURE MAP

The following public roads should be closed if a **FAILURE IN PROGRESS** or a **FAILURE IMMINENT** condition exists. Although inundation of State Route 169 is extremely unlikely to occur, road failures may still be possible within the conveyance system beneath the road. Water is eventually discharged to the Lower Cedar River. Until road is deemed safe by a transportation engineer, close State Route 169 between 140<sup>th</sup> Way SE and 152 Ave. SE; close the driveway entrance just east of 140<sup>th</sup> due to the potential of through traffic.

